

The Western Irish Sea Front - A Potential MPA

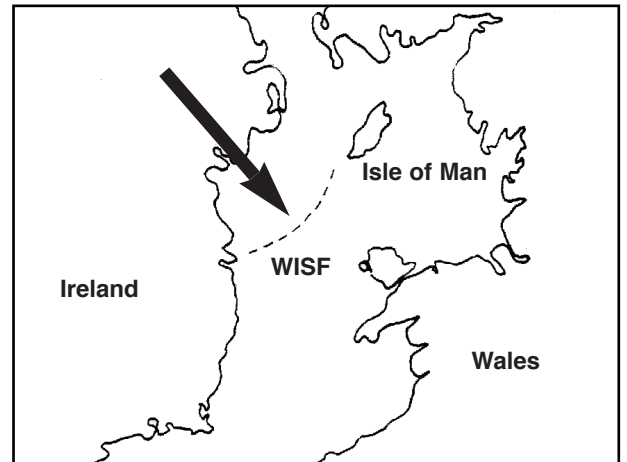
Potential Reasons for Selection

The Western Irish Sea Front (WISF) represents a distinct, though temporal, oceanographic feature. Research has indicated high productivity in the area and associated important feeding grounds for a number of marine species. The high productivity identified with the front may result in modifications of associated communities and ecosystems, particularly benthic communities.

Site Description

The WISF forms seasonally in the late springtime (at approximately March/April) and persists throughout the summer until September or October. The WISF marks the boundary between tidally mixed water to the south-east, and stratified water to the north-west. The front remains in a relatively static position throughout the summer and develops particularly along the southern and eastern edge.

As a consequence of the stratified water development and the tidal mixing front between the Isle of Man and Dublin there is restricted flushing in the bottom water of this region. Thus winter water persists for much of the spring and summer as a dome of cold water overlying the seabed, to the immediate north-west of the front. The resulting density structure and geostrophic forces generate a cyclonic gyre of near surface water (Dickey-Collas et al. 1996).



increase and nitrates become depleted. Peaks in the standing stock of phytoplankton have been measured on the surface-stratified side of the front as well as in patches below the surface, in the vicinity of the pycnocline. Concentrations of phytoplankton standing stock in the above-identified areas can be twice those observed in the adjacent mixed water mass.

Beardall et al. (1982) reported that there were distinct differences in the mix of species found either side of the front. In the surface stratified water flagellates made up a greater proportion of the samples, while diatoms were dominant within the mixed water. The surface stratified waters appear to be an area of intense biological activity, especially in the vicinity of the area of the front, the most consistently rich area being where the front meets the coastal current of the Kish Bank on the Irish coast. Biological activity was low in the mixed water mass when compared to the frontal or stratified regions.

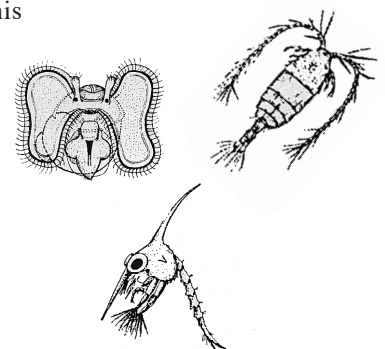
Phytoplankton

Three distinct water masses can be identified around the front: surface stratified water; bottom stratified water; and mixed water. As a result of the proximity of these water masses and associated eddies and upwellings, nutrients are readily supplied to surface waters, creating favourable conditions for the growth of phytoplankton. Consequently, as the front develops the chlorophyll concentrations in the surface stratified water

Zooplankton

There is a gradual transition in the distribution and total production of zooplankton from the stratified to mixed water bodies across the front rather than a sudden change. Scrope-Howe & Jones (1985) did report occasional patches of high zooplankton concentrations in the stratified water in the vicinity of the front with species such as the copepods *Oithona similis*, *Acartia clausi* and the larvae of gastropods and lamellibranchs. They attributed this to localised high densities of chlorophyll and copepod production rather than mechanical aggregation at the front.

Zooplankton concentrations were low in the bottom-stratified waters and mixed waters.



Justification for the Potential Selection of the Western Irish Sea Front as an Offshore Marine Protected Area

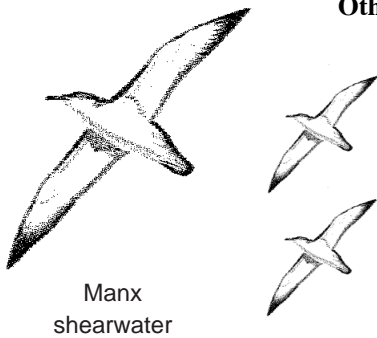
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Fish eggs, whenever they occurred, were always closely associated with the frontal zone. Dickey-Collas et al. (1996), have suggested that the occurrence of a seasonal gyre, immediately adjacent to the north-west of the front, may retain early life stages of a number of fish in the western Irish sea. This area has also been identified as an area of high zooplankton biomass, and it is likely that the gyre also acts to retain planktonic animals within the stratified region, immediately to the west of the WISF (Gowen et al. 1998).

Benthos

The regular supply of organic material sinking to the seabed may have enhanced the local richness of the bottom-dwelling communities. Holme & Rees (1986) reported unusually dense stands of filter-feeding species from a narrow band and distance on the seabed beneath this front. The polychaete worm *Amparete falcata* was found at densities of approximately 3000/m² and *Parvicardium ovale* at approximately 27000/m². Other species reported were the bivalve molluscs *Nucula tenuis*, *Abra nitida*, and the crustaceans *Pandalus montagui* and *Crangon allmani*.



Manx shearwater

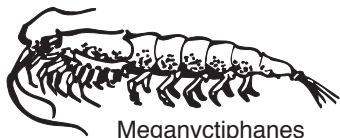
Other Species

A number of other species may be attracted to the area of the WISF, as a result of its relatively high productivity.

Flocks of several hundred Manx shearwaters have been

reported in the vicinity of the front, particularly on the stratified side, during the summer months and it is also an important area for razorbills and guillemot. Basking sharks have also been reported concentrating feeding activity along the front, and have been observed in relatively high numbers in the area of the Isle of Man.

Patches of dense sonar scattering have been regularly reported around the pycnocline within a few kilometres of the stratified side of the front. This sonar evidence is likely to be fish and microplankton.



Meganyctiphanes norvegica

Fogg et al. (1985) reported these layers were regularly seen at dawn and descended during the day to form a layer around 60-65m. Given the speed at which they descended, it was suggested that fish are probably the main constituent of such layers. Species caught in the vicinity were predominantly juvenile sprat (*Sprattus sprattus*) and the euphausiid *Meganyctiphanes norvegica*.

Existing/Proposed Protection

There is currently no existing or proposed protection for the area of the Western Irish Sea Front.

Likely Management Issues

The Irish Sea is generally acknowledged to be heavily fished. Oil and gas exploitation has become increasingly important within the region, and a number of exploration and production licences for various areas within the Irish Sea have already been granted by various governments. Pollution of the Irish Sea from various land based sources, including sewage, industrial, litter and radionuclide pollution, has previously been identified, and may continue to be significant. The Irish Sea is also a major area for shipping.

Text prepared by Chris Berry and Sarah Jones

References / Further Reading

This document is substantially based upon: Gubbay, S. (1996) The Potential for Marine Protected Areas in UK Offshore Waters. WWF-UK Report, 6-8.

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